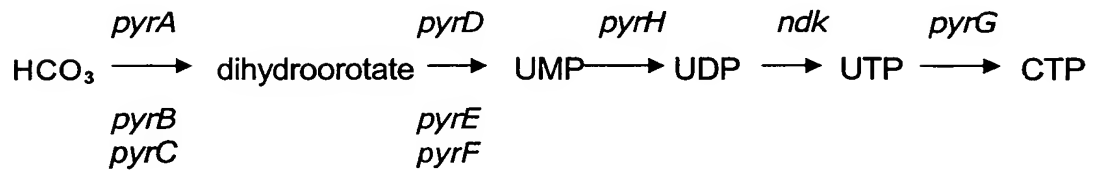


**Figure 1a:** Diagram of the "de novo" pathway of UTP and CTP in *E. coli*

*ndk*: nucleoside diphosphokinase

*pyrA*: carbamoylphosphate synthase

*pyrB*: aspartate carbamoyltransferase

*pyrC*: dihydroorotase

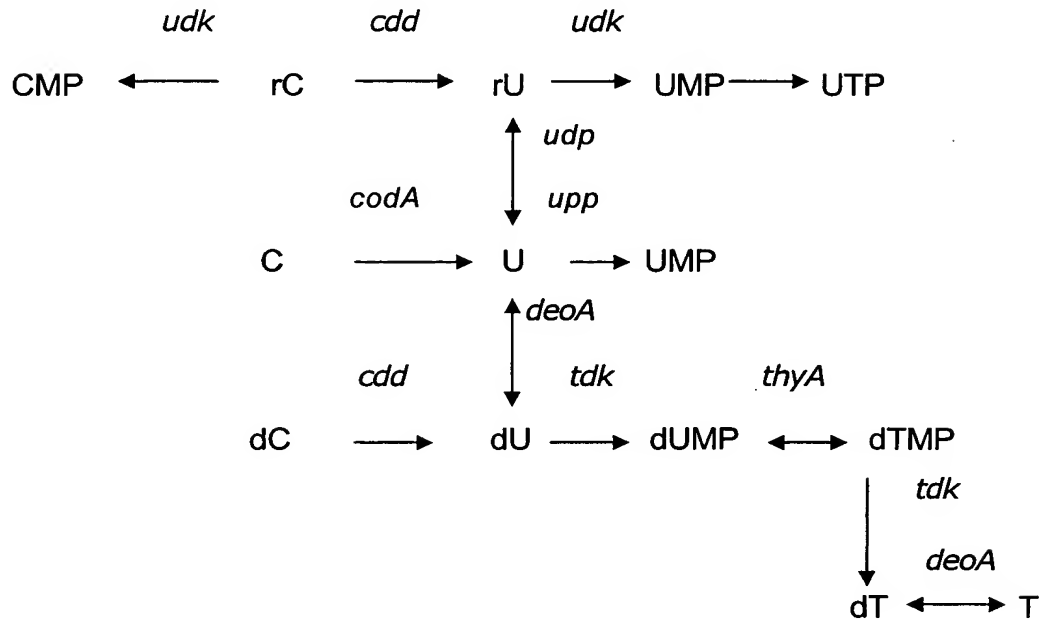
*pyrD*: dihydroorotate oxydase

*pyrE*: orotate phosphoribosyltransferase

*pyrF*: orotidine 5'-phosphate decarboxylase

*pyrG*: CTP synthetase

*pyrH*: UMP kinase

**Figure 1b: Recycling route of pyrimidines in *E. coli***

*cdd*: cytidine/deoxycytidine deaminase

*cmk*: CMP/dCMP kinase horylase

*codA*: cytosine deaminase

*deoA*: thymidine phosphorylase

*tdk*: thymidine kinase

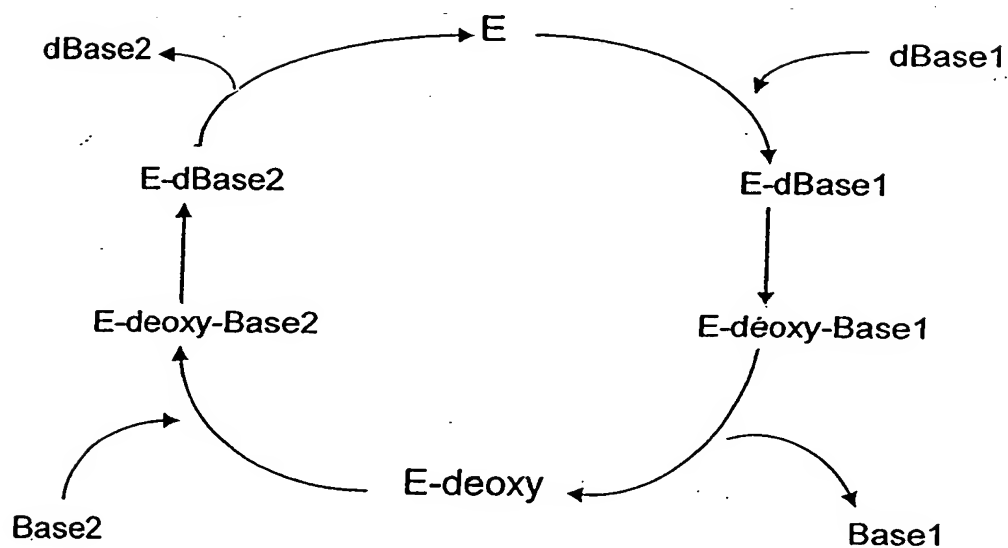
*udk*: uridine/cytidine kinase

*udp*: uridine phosphorylase

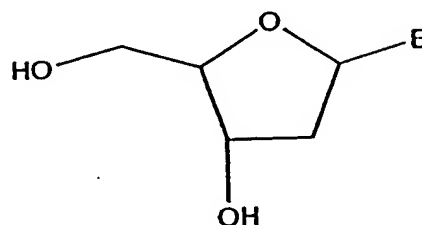
*upp*: uridine phosphoryltransferase

*thyA*: thymidylate synthase

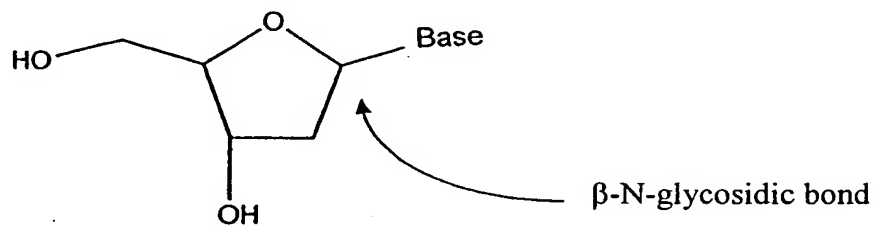
The enzymes are represented above by their corresponding genes.



\* E-deoxy = enzyme-deoxyribose of the form  
(E = active site of the enzyme)



\*dbase = deoxyribonucleotide



**Figure 2**

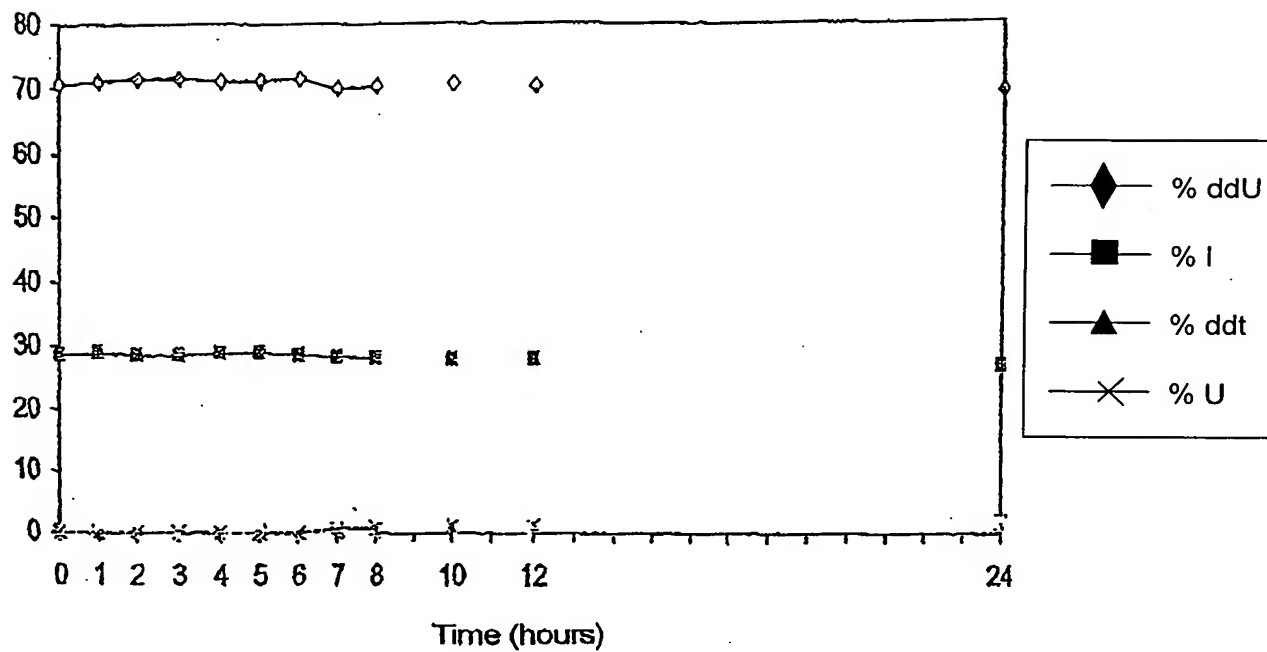
Reaction  $ddU+f=ddl+U$  for  $psu-ntdA$ 

Figure 3

Reaction  $ddU+I=ddl+U$  for  $psu-ntd^*C$

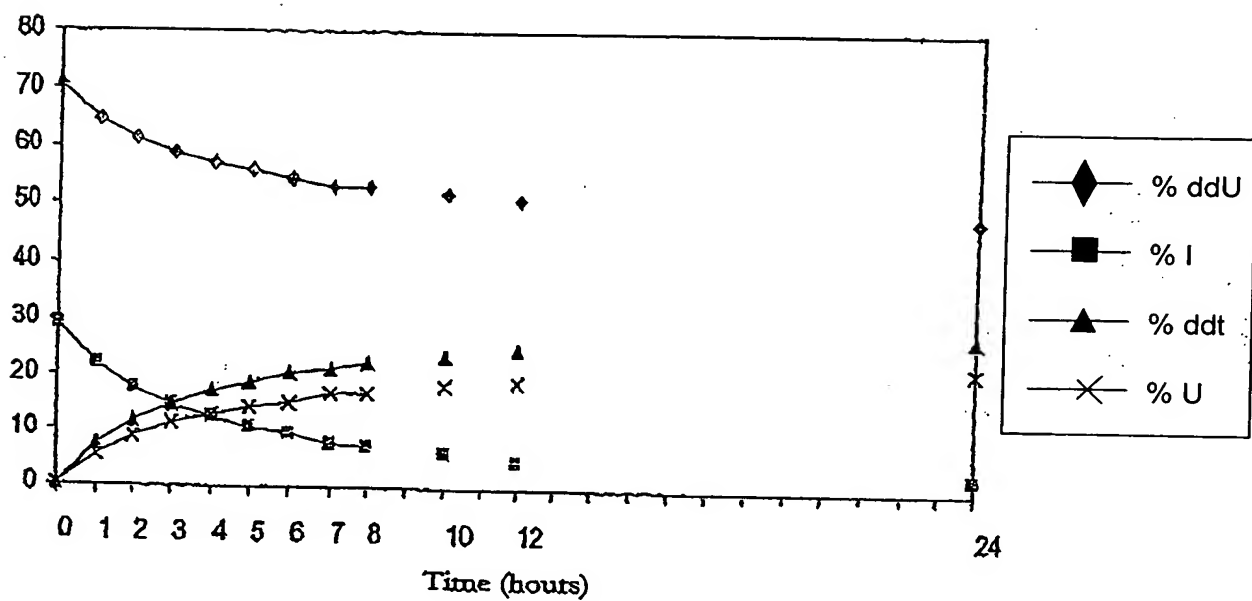


Figure 4

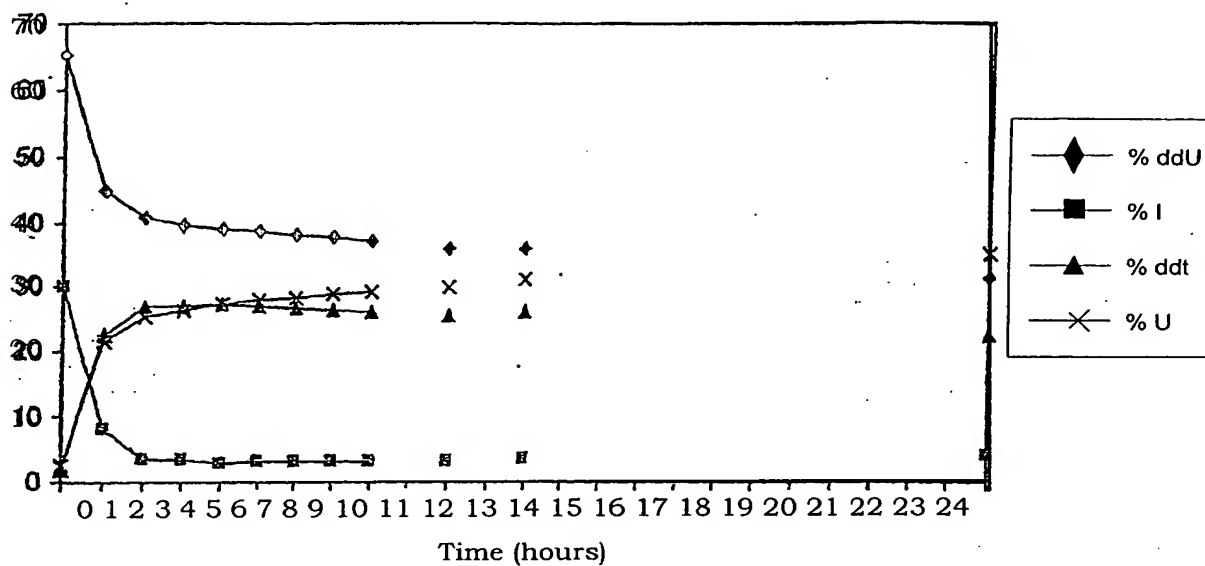
Reaction  $dU+i=dI+U$  for pSU-*ntdA*

Figure 5

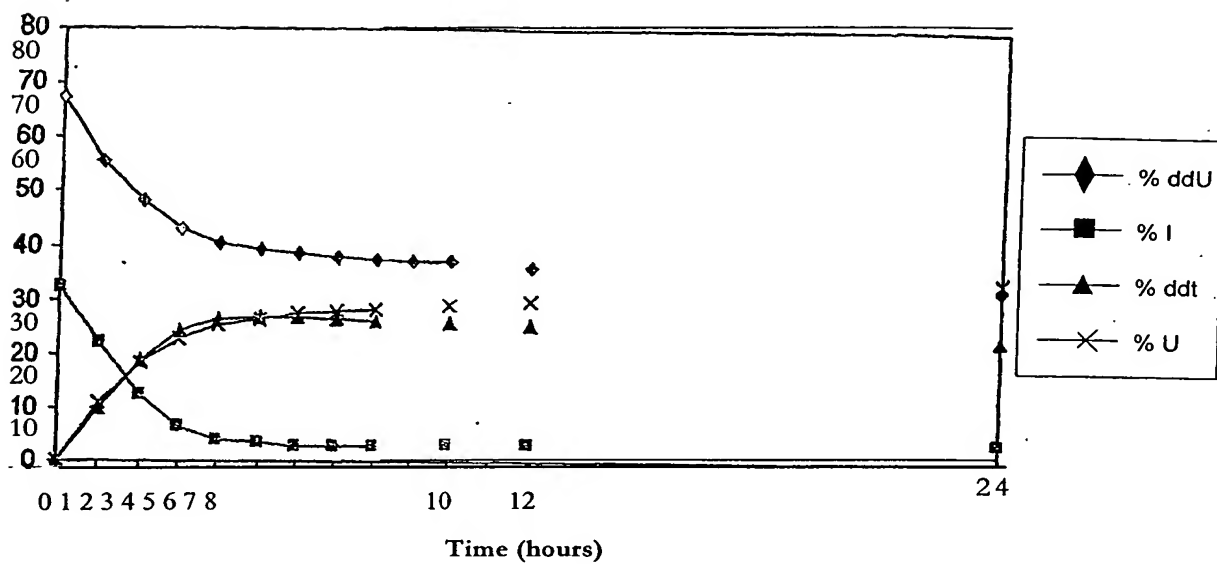
Reaction  $dU+I=dl+U$  for pSU'ntd\*C

Figure 6